

Appl. No. 10/665,028

Amdt. Dated October 12, 2006

Reply to Final Office Action of January 31, 2006

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This is a full and timely response to the Office Action mailed July 12, 2006.

Reexamination and reconsideration in view of the foregoing amendments and following remarks is respectfully solicited.

Claims 1-9 are pending in this application, with Claims 1, 5, 6, and 7, being the independent claims. Claims 1, 5, 6, and 7 have been amended. No new matter is believed to have been added.

Rejection Under 35 U.S.C. § 112

The Examiner rejected Claims 7-9 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

The Examiner stated that in the last line of Claim 7 the phrase "cover covering" is not clear.

Claim 7 has been appropriately amended to clarify the meaning of the above-mentioned phrase.

Applicant, accordingly, respectfully requests withdrawal of the rejections of Claims 7-9 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Rejections Under 35 U.S.C. § 103

The Examiner rejected Claims 1 and 5-9 under 35 U.S.C. § 103(a) as being unpatentable over Lowney in view of Kuhn and in view of Sullivan and in view of JP07112294A.

Claims 1, 5, 6, and 7 have been amended to include a detachable housing circumscribing an end of the outer nozzle that defines a shield gas flow channel having an opening that circumscribes the end of the outer nozzle. Specifically, claim 1 includes the limitation "a housing detachably coupled to the outer nozzle and circumscribing the second end of the outer nozzle in spaced apart relationship to define a circumscribing

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shield gas flow channel about the outer nozzle, the shield gas flow channel having an opening circumscribing the second end of the outer nozzle." Claim 5 includes the limitation "a detachable housing circumscribing the second end of the outer nozzle in spaced apart relationship to define a circumscribing shield gas flow channel about the outer nozzle, the shield gas flow channel having an opening circumscribing the second end of the outer nozzle." Claim 6 includes the limitations "a housing defining a third central open channel through which fluid may pass, the housing detachably attached to the main body and circumscribing the second end of the outer nozzle" and "a shield gas flow channel defined between the outer nozzle and the housing and having a circular opening circumscribing the second end of the outer nozzle." Claim 7 include the limitation "a housing detachably attached to the nozzle and circumscribing the second end of the outer nozzle in spaced apart relationship to define the shield gas flow passage, the shield gas flow passage having a circular opening circumscribing the second end of the outer nozzle and proximate the tip."

Lowney does not teach or suggest a detachable housing circumscribing an end of the outer nozzle that defines a shield gas flow channel having an opening that circumscribes the end of the outer nozzle. Lowney teaches a nozzle particularly suited to direct metal deposition increases the quality of metallurgical properties, enhances deposition rate and process efficiency, and improves surface quality, reliability, and maintainability (Abstract). As shown in Figure 1, the nozzle assembly includes a main body 102, inner tip housing 104, an inner tip 106, an outer shaping gas tip 108, and a cooling passage collar 110 (column 2, line 66-column 3, line 2). The laser beam is focused through the center of the inner tip 106. The outer, or shaping, tip 108 provides gas flow concentric to the powder flow and laser beam. The shaping gas tip 108, best seen in FIG. 3, is preferably comprised of a plurality of evenly spaced ports around the diameter of the outer tip. (column 4, lines 46-50) The gas is delivered to the nozzle by tubes 302, which supplies a gland of predetermined volume within the nozzle. This cavity is the supply for the gas ports through the shaping gas tip. (column 4, lines 53-56) Lowney thus teaches a plurality of gas ports around the inner tip of the nozzle. Specifically, Lowney does not teach or suggest a detachable housing circumscribing an

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end of the outer nozzle that defines a shield gas flow channel having an opening that circumscribes the end of the outer nozzle.

Kuhn does not teach or suggest a detachable housing circumscribing an end of the outer nozzle that defines a shield gas flow channel having an opening that circumscribes the end of the outer nozzle. Kuhn teaches a nozzle/baffle array for use within the gain generator of a cylindrical laser (Abstract). A spring support is provided that supports the nozzle blades in accurate alignment and allows them to expand radially (column 1, lines 55-57). Kuhn makes no mention of a shield gas flow channel.

Sullivan does not teach or suggest a detachable housing circumscribing an end of the outer nozzle that defines a shield gas flow channel having an opening that circumscribes the end of the outer nozzle. Sullivan teaches an apparatus for subjecting a workpiece to the action of a laser beam. (Abstract) As shown in figures 3 and 5, the nozzles used in Sullivan do not include a housing circumscribing a tip of a nozzle. Further, Sullivan makes no mention of a shield gas flow channel having an opening that circumscribes the end of the outer nozzle.

JP07112294A does not teach or suggest a detachable housing circumscribing an end of the outer nozzle that defines a shield gas flow channel having an opening that circumscribes the end of the outer nozzle. JP07112294A teaches a nozzle unit fitted with nozzles in freely attachable-detachable to-from a housing in which a reflection mirror is housed. A nozzle unit 3 for welding and a nozzle unit for cutting are provided on a female screw part 22 of a housing 2 in a freely attachable-detachable configuration. JP07112294A thus teaches detachable housing elements in a laser nozzle environment. However, JP07112294A makes no mention of a shield gas flow channel having an opening that circumscribes the end of the outer nozzle.

Therefore, Claims 1, 5, 6, and 7 are patentable over Lowney in view of Kuhn and in view of Sullivan and in view of JP07112294A. because Claims 1, 5, 6, and 7 include limitations that are not taught or suggested by Lowney, Kuhn, Sullivan, or JP07112294A.

Claims 8 and 9 are dependent on Claim 7 and should be allowable for at least the same reasons as Claim 7 stated above.

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Applicant, accordingly, respectfully requests withdrawal of the rejections of Claims 1 and 5-9 under 35 U.S.C. § 103(a) as being unpatentable over Lowney in view of Kuhn and in view of Sullivan and in view of JP07112294A.

The Examiner rejected Claims 2 and 3 under 35 U.S.C. § 103(a) as being unpatentable over Lowney in view of Kuhn and in view of Sullivan and in view of JP07112294A, and further in view of Buongiorno.

Claims 2 and 3 are dependent on Claim 1 and should be allowable for at least the same reasons as Claim 1 stated above.

Applicant, accordingly, respectfully requests withdrawal of the rejections of Claims 2 and 3 under 35 U.S.C. § 103(a) as being unpatentable over Lowney in view of Kuhn and in view of Sullivan and in view of JP07112294A, and further in view of Buongiorno.

The Examiner rejected claims 4-9 under 35 U.S.C. § 103(a) as being unpatentable over Lowney in view of Kuhn and in view of Sullivan and in view of JP07112294A, and in view of Buongiorno, and further in view Patent Application Publication No. US2004/0099643A1 ("Fabbro").

Claim 4 is dependent on Claim 1 and should be allowable for at least these same reasons as Claim 1 stated above.

As previously discussed, Claims 5, 6, and 7 have been amended to include a detachable housing circumscribing an end of the outer nozzle that defines a shield gas flow channel having an opening that circumscribes the end of the outer nozzle.

Also as previously discussed, Lowney, Kuhn, Sullivan, and JP07112294A do not teach or suggest a detachable housing circumscribing an end of the outer nozzle that defines a shield gas flow channel having a circular opening that circumscribes the end of the outer nozzle.

Buongiorno does not teach or suggest a detachable housing circumscribing an end of the outer nozzle that defines a shield gas flow channel having an opening that circumscribes the end of the outer nozzle. Buongiorno teaches a laser powered laser cladding apparatus that projects a laser beam to impinge upon a metal workpiece to form

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a shallow puddle of liquid metal. (Abstract) As illustrated in figure 1, the laser powered metal cladding apparatus 10 includes a rear or upper unit 11 consisting of three elements 12-14 and a front or bottom unit 15 that consists of three other elements 16-18. Element 16 is an inner conical cup that is disposed within an outer conical cup 17 and is fixedly connected thereto by a brazing operation that employs solder rings in annular grooves 31-33 of the inner cup 16. An inner surface portion of the front unit 15 and a confronting outer surface portion at the front portion of the rear unit 11 are spaced slightly from each other and cooperate to perform an annular conical passage 35 through which metal powder for cladding is delivered to outlet opening 23. (column 4, line 66-column 5, line 3) The confronting inner and outer surfaces of the respective cups 17 and 16 cooperate to form an annular conical fluid jacket 40 which is accessible through two apertures 41 that extend transversely through outer cup 17. (column 5, lines 7-10) At the rear of fluid jacket 40 is a relatively large manifold 42 formed by an annular groove in the outer surface of inner cup 16 which is, for the most part, closed by outer cup 17. The large manifold 42 is provided with the gas entrances provided by two apertures 43 that extend through the side of the outer cup 17. (column 5, lines 11-15) Inert shielding gas for shielding the weld area and cooling the removable tip 18 is supplied to the large manifold 42 through all four apertures 3 and flows through the four tubes 45 to the small manifold 46. Buongiorno thus teaches a manifold system for a welding head located between two fixed portions of an outer nozzle. Specifically, Buongiorno does not teach or suggest a detachable housing circumscribing an end of the outer nozzle that defines a shield gas flow channel having an opening that circumscribes the end of the outer nozzle.

Fabbro teaches blowing gas onto a weld area by means of a ring nozzle to allow centripetal flow of the gas. (Abstract) As illustrated in figure 1, the nozzle 6 is made up of an inner tube 8 and an outer tube 9, which are concentric and therefore define a ring-shaped chamber 10 between them. (paragraph 0008) Fabbro makes no mention of a detachable housing circumscribing an end of the outer nozzle that defines a shield gas flow channel having an opening that circumscribes the end of the outer nozzle.

Therefore, Claims 5, 6, and 7 are patentable over Lowney in view of Kuhn and in view of Sullivan and in view of JP07112294A, and in view of Buongiorno, and further in

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view of Fabbro because claims 5, 6, and 7 include limitations not taught or suggested in Lowney, Kuhn, Sullivan, JP07112294A, Buongiorno, or Fabbro.

Claims 8 and 9 are dependent on Claim 7 and should be allowable for at least the same reasons as Claim 7 stated above.

Applicant, accordingly, respectfully requests withdrawal of the rejections of claims 4-9 as being unpatentable over Lowney in view of Kuhn and in view of Sullivan and in view of JP07112294A and in view of Buongiorno, and further in view of Fabbro.

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Based on the above, independent Claims 1, 5, 6, and 7 are patentable over the citations of record. The dependent claims are also submitted to be patentable for the reasons given above with respect to the independent claims and because each recite features which are patentable in its own right. Individual consideration of the dependent claims is respectfully solicited.

The other art of record is also not understood to disclose or suggest the inventive concept of the present invention as defined by the claims.

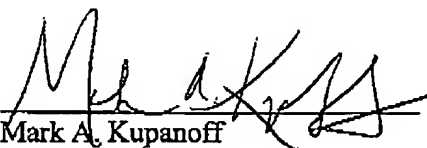
Hence, Applicant submits that the present application is in condition for allowance. Favorable reconsideration and withdrawal of the objections and rejections set forth in the above-noted Office action, and an early Notice of Allowance are requested.

If the Examiner has any comments or suggestions that could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the below-listed number.

If for some reason Applicant has not paid a sufficient fee for this response, please consider this as authorization to charge Ingrassia, Fisher & Lorenz, Deposit Account No. 50-2091 for any fee which may be due.

Respectfully submitted,

INGRASSIA FISHER & LORENZ

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